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## Law Enforcement Officers' Involvement Level in Hurricane Katrina and Alcohol Use

**Sarah Cercone Heavey<sup>1</sup>, Gregory G. Homish<sup>1</sup>, Michael E. Andrew<sup>2</sup>, Erin McCanlies<sup>2</sup>, Anna Mnatsakanova<sup>2</sup>, John M. Violanti<sup>3</sup>, and Cecil M. Burchfiel<sup>2</sup>**

<sup>1</sup>Department of Community Health and Health Behavior, University at Buffalo, The State University of New York

<sup>2</sup>Biostatistics and Epidemiology Branch, Health Effects Laboratory Division, National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention

<sup>3</sup>Department of Epidemiology and Environmental Health, University at Buffalo, The State University of New York

### Abstract

The purpose of this work is to examine the relationship between alcohol use and level of involvement during Hurricane Katrina among law enforcement officers, and to investigate whether marital status or previous military training offer resilience against negative outcomes. Officers in the immediate New Orleans geographic area completed surveys that assessed their involvement in Hurricane Katrina and alcohol use (Alcohol Use and Disorders Identification Test (AUDIT) score). Negative binomial regression models were used to analyze level of hazardous alcohol use; interactions were tested to examine protective influences of marriage and prior military training (controlling for age and gender). There was a significant association between heavy involvement in Hurricane Katrina and having a greater AUDIT score ( $\exp(\beta)[EB]=1.81$ ; 95% CI: 1.03, 3.17;  $p<0.05$ ), indicating higher levels of hazardous alcohol use. Contrary to original hypotheses, marital status and military training were not protective against alcohol use ( $p>0.05$ ). These results illustrate an association between law enforcement officers' heavy involvement during Hurricane Katrina and greater levels of hazardous alcohol use when compared to officers with low or moderate involvement. This has important treatment implications for those with high involvement in disasters as they may require targeted interventions to overcome the stress of such experiences.

### Keywords

Alcohol consumption; first responders; Hurricane Katrina; natural disaster; law enforcement

### Introduction

First responders represent a unique class of individuals affected by disaster. The nature of this work can often be dangerous, and situations are likely exacerbated by the environmental

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\*Correspondence regarding this article should be directed to: Cercone6@buffalo.edu.

hazards and personal stressors of traumatic events. The nature of the traumatic event plays an important role in the behavioral and psychological outcomes (Benedek, Fullerton, & Ursano, 2007). Benedek et al. (2007) distinguish three severity categories for traumatic events, mild, moderate, and severe. Individuals fall into one of those three categories based on the nature of the event, and the most significant predictors of outcome severity are proximity, duration, and exposure intensity (Benedek et al., 2007).

Disaster survivors are faced with traumatic events both during and after the event, including the widespread devastation, loss of life, personal danger, and costly destruction. Previous research has found that such natural disasters and disaster-related stressors are associated with development of post-traumatic stress disorder, anxiety disorders, and depressive disorders (Galea et al., 2007; McLaughlin et al., 2011). Further, research has shown that there is a dose-response relationship between disaster exposure and negative mental health outcomes. For example, in the wake of the Mt. St. Helen's volcanic eruption, Shore, Tatum, and Vollmer (1986) found a significant dose-response relationship between exposure to the disaster and increased mental disorders. The greater an individual's exposure to the Mt. St. Helen's eruption, the more likely the individual was to be diagnosed with single-episode depression, generalized anxiety disorder, or posttraumatic stress disorder. In addition, there were marked increases in prevalence of those three disorders among those with the highest exposure when compared to those with low exposure or no exposure (control group).

More recently, Fergusson, Horwood, Boden, and Mulder (2014) found a dose-response relationship between exposure and impact of the earthquake and a range of mental health outcomes. After exposure to a series of four major earthquakes (Richter Scale >6.0), individuals with the greatest exposure had rates of mental illness that were 1.4 times higher than those individuals with no exposure. Specifically, individuals experienced increased rates of DSM-IV symptom criteria for major depression, posttraumatic stress disorder, anxiety disorder, and nicotine dependence. In addition, the authors found similar increases when examining sub-clinical symptoms.

First responders also exhibit the noted dose-response relationship between level of disaster exposure and poor mental health outcomes. Fullerton, Ursano, and Wang (2004) found that in the years following the September 11<sup>th</sup> attacks, first responders exposed to the disaster had higher rates of acute stress disorder, post-traumatic stress disorder, and depression than those without exposure. First responders with high levels of exposure had greater odds of developing acute stress disorder, posttraumatic stress disorder, and depression than the comparison group. Fullerton and colleagues also found specific subgroups of first responders that were more likely to have negative mental health outcomes. Specifically, they found that first responders with high exposure and previous disaster experience were nearly seven times more likely to develop post-traumatic stress disorder than those without previous disaster experience.

These negative effects are frequently compounded for first responders as they are assigned atypical work activities during disasters that they may not have been adequately trained for and experience additional personal stressors, such as extended work hours, sleep deprivation, home destruction, and separation from family (Bernard, Driscoll, Kitt, West, &

Tak, 2006). Osofsky and colleagues found that first responders continued to experience depression and PTSD symptoms eighteen months after Hurricane Katrina (Osofsky et al., 2011). In addition, our previous work has found that negative effects of disasters impact responders who work with, but did not directly respond to, a disaster; there was a significant increase in alcohol use among firefighters who were linked to responders but did not respond themselves to the crash of a commercial airplane (Homish, Frazer, & Carey, 2012).

An increase in alcohol consumption in the post-disaster period is an additional negative consequence of disaster exposure. For example, survivors of the Oklahoma City bombing had greater alcohol consumption in the time after the attack (Pfefferbaum & Doughty, 2001). Also, exposure to additional hurricane-related stressors was associated with greater alcohol consumption as well as greater odds of binge drinking in the post-disaster period (Cerdeira, Tracy, & Galea, 2011). In addition, the research by Flory, Hankin, Kloos, Cheely, and Turecki (2009) indicates that Hurricane Katrina survivors experienced increased hazardous alcohol use.

There is a dose-response relationship with trauma or disaster exposure and alcohol consumption. Greater exposure to the World Trade Center disaster was associated with greater alcohol consumption at one and two years after the attacks; in addition, binge drinking one year after the disaster was also associated with greater exposure to the attacks (Boscarino, Adams, & Galea, 2006). In some cases, there appears to be a threshold effect, as those with low or moderate levels of lifetime trauma did not have significant changes in alcohol use, but those with high levels of lifetime trauma did have increased alcohol use after hurricane related stressors (Cerdeira et al., 2011).

First responders have higher levels of hazardous alcohol use than is expected in a typical community population (Boxer & Wild, 1993). Nearly two-thirds (64%) of a police sample exceeded the recommended daily alcohol consumption, with 17.2% engaging in hazardous drinking, as defined by the authors as consuming six or more drinks on one occasion, on a weekly or daily basis (Violanti et al., 2011). This is nearly double the percent of hazardous drinkers in a U.S. national workplace sample that had a rate of 8.8% (Larson, Eyerman, Foster, & Gfroerer, 2007).

Police work is one example of a “hard drinking” occupation and shares many risk factors for alcohol abuse, such as stress, isolation, peer influences, preponderance of young males, and group norms (Violanti et al., 2011). Police work stressors include critical incident exposure and the inherent dangers of police work, but also aspects of the work environment, such as administrative, bureaucratic, and organizational components (Lieberman et al., 2002). Further, Lindsay and Shelley (2009) suggest that police officers' alcohol use is influenced by a desire to fit in with their peers and view alcohol consumption as a social outlet. Thus, it is reasonable to expect these added pressures uniquely affect police officers' experiences during disaster and alcohol use in the post-disaster period.

Given the additional stressors police officers face during disaster response, as well as the increased prevalence of hazardous or high risk drinking behaviors, it is important to consider factors that may act as buffers against poor health outcomes and behaviors. Previous

research has shown that marriage has a protective effect against the development of poor health outcomes in first responders. For example, unmarried first responders had significantly greater odds of developing acute stress disorder in the post disaster period; this relationship was also true for single first responders developing depression (Fullerton et al., 2004). This also holds true for drinking behaviors as we have found in previous work that unmarried and divorced male officers were significantly more likely to have higher Alcohol Use and Disorders Identification Test (AUDIT) scores than their married counterparts (Violanti et al., 2011).

Another factor that could act as a moderator for first responders is whether they have experienced prior military service. This may be particularly relevant as United States law enforcement operates within a paramilitary model, with significant overlaps between military and police functions (Kraska & Kappeler, 1997; Patterson, 2002). Kraska and Kappeler (1997) argue that police departments have experienced a significant intensification of military culture, including adapting uniforms, weapons, training, tactics and even language. Given these cultural shifts, it seems logical that an individual with military training would better assimilate to police culture and adapt to job demands that were similar to those for which s/he had already been trained.

Military experience can also provide supplementary skills, such as self-confidence, ability to work well with others in the unit, and leadership skills that can be beneficial to police first responders in stressful situations (Andrisani & Daymont, 1991). Thus, the traumatic and stressful experiences police officers encounter could be mitigated by the additional training and experiences a military service history affords. In previous work, we have found that military service history for police officers has a protective effect. Our results found that police officers without prior military service had greater stress levels after experiencing physically and psychologically threatening events than those officers with previous service (Hartley, Violanti, Mnatsakanova, Andrew, & Burchfiel, 2013).

In this report, we will examine associations of involvement level during Hurricane Katrina with alcohol use among police officers who were involved during the disaster, and determine whether marital status and prior military service modified this relationship. Hurricane Katrina was unique as it was one of the strongest storms to impact the United States in the past 100 years, with New Orleans, LA bearing the brunt of the disaster (Waple, 2005). As a result of the broken levees, more than 80% of New Orleans, LA was flooded, and the devastation included more than 1000 deaths and over one million individuals displaced across the Gulf of Mexico, as well as billions of dollars in water and wind damage (Cerdeira et al., 2011; Flory et al., 2009; Rosenbaum, 2006; Waple, 2005). As a result, Hurricane Katrina first responders (police, firefighters, EMTs, and city workers) experienced severe stressors, including 69% who witnessed an injury or death, 52% who experienced extreme damage to their home, and 25% who experienced the death of a friend (Osofsky et al., 2011).

The primary aim of this report is to determine whether there is an association between involvement level in Hurricane Katrina and alcohol use among police officers who worked

as first responders during the storm. The second aim is to determine whether marital status and/or prior military service act as buffers to that relationship.

## Methods

Sworn police officers in a Police Department within the New Orleans region were asked if they would voluntarily participate in an evaluation of their psychological well-being post-involvement in Hurricane Katrina. All police officers in this department were eligible to participate, and informed consent was obtained from each individual officer. In April 2012, officers completed informed consent documents and survey instruments and were instructed to mail the documents to the principal investigator when complete. No compensation was offered for participation in the survey. The research protocol was approved by the State University of New York at Buffalo's Institutional Review Board and the National Institute for Occupational Safety and Health Human Subjects Review Board.

## Participants

Police officers from a Police Department in the New Orleans area ( $n=122$ , 49.2% of department) participated in this cross-sectional survey administration. Of these officers, 81% indicated their level of involvement during Hurricane Katrina ( $n=99$ ) and were included in the current analyses.

## Measures

Police officers completed pencil-and-paper survey packets that included informed consent documentation, demographic information, and survey questionnaires. Surveys were used to assess demographics, quality of life (perceived stress, recent life changes, global life satisfaction), mental health (posttraumatic stress disorder, depression), alcohol use, physical health (health conditions, current medications), resiliency, social and organizational support, posttraumatic growth, and gratitude. For this report, alcohol use, involvement level in Hurricane Katrina, marital status, military service, and demographic factors were included in the models.

## Alcohol Use

Alcohol use was measured using the Alcohol Use Disorders Identification Test (AUDIT; Babor, Higgins-Biddle, Saunders, & Monteiro, 2001). The AUDIT is a ten item questionnaire that assesses the frequency of drinking behaviors, quantity of alcohol consumption, and social factors of drinking, such as whether someone has expressed concern regarding drinking habits. Each response ranges from 0 to 4, and all responses are summed for a total score. Higher scores on the AUDIT indicate greater likelihood of hazardous drinking. The alpha level for this sample is 0.79, indicating generally strong internal consistency.

## Involvement Level

The police officers' involvement level during Hurricane Katrina was assessed among those officers who indicated that they did work as a sworn officer during the Hurricane Katrina storm. Officers were asked to what degree s/he were involved with the storm and were given

three response choices, heavy involvement, moderate involvement, or light involvement. Heavy involvement was defined as “I participated in almost all rescue and recovery operations and was constantly in close proximity to all police activities related to the storm;” moderate involvement was defined as “I participated in rescue and recovery operations to some extent, but not constantly. I had other duties to consider away from the storm;” and light involvement was defined as “I participated in some rescue and recovery operations to a little extent, but I had other duties to consider away from the storm.”

### **Resilience Factors: Marital Status & Military Service**

Marital status was assessed with one question asking for the participant's current marital status. Response options included never married, married, widowed, divorced/separated, divorced and remarried, and living with someone. For these analyses, marital status was recoded to a binary variable, married or living as if married and not married. Those who were married or living with someone as if married, included respondents who indicated they were currently married, divorced and remarried, or living with someone as if married. Those who were classified as not married included those who indicated they were never married, widowed, or divorced/separated.

Military service was assessed by asking respondents if they were ever in the military (yes/no). Participants were also asked to identify which branch of the military s/he belonged, as well as length of service in years, and rank upon discharge.

### **Potential Covariates: Age & Gender**

Age and gender were examined as potential covariates in the models.

### **Statistical Analysis**

Descriptive statistics were used to characterize police officers who worked as sworn officers during Hurricane Katrina. The primary method of statistical analysis was negative binomial regression. Due to the nature of an outcome variable (a count), either Poisson or negative binomial regression was chosen as appropriate methods. Negative binomial regression was chosen as the assumptions are less restrictive than Poisson and is more appropriate for over-dispersed count data (Gardner, Mulvey, & Shaw, 1995).

First, unadjusted associations between involvement level during Hurricane Katrina and AUDIT score were explored. Second, these models were adjusted for age and gender. Finally, the third model examined resilience factors (marital status and prior military service) as potential moderators to the association between exposure and AUDIT score. All statistical analyses were performed using Stata (Version 13.1).

## **Results**

### **Participants**

Within the sample, 99 participants (81% of the full 122 person sample) worked as sworn officers during Hurricane Katrina and indicated their level of exposure. Of these officers, 78.4% (n=76) were male, and the mean age was 45.1 years (SD =7.8; Table 1). The majority

of respondents were European American (54.1%,  $n=53$ ) or African American (41.8%,  $n=41$ ). The mean number of years of police service for these officers was 19.2 years ( $SD=8.0$ , Range: 6 – 35). Police officers represented a wide range of officer ranks, including sergeant (30.9%,  $n=30$ ), lieutenant (15.5%,  $n=15$ ), captain (1%,  $n=1$ ), and detective (13.4%,  $n=13$ ). The majority were married or living as if married (62.2%,  $n=61$ ); only 22.5% ( $n=22$ ) had prior military service. Nearly half (45.5%,  $n=10$ ) of those with prior military service had served in the Army, 22.7% ( $n=5$ ) had served in the Navy, and the remaining individuals served in the Marine Corp, Air Force, or National Guard (31.8%,  $n=7$ ). These individuals had 6.8 years of military service, on average ( $SD=6.3$ , Range: 1 – 27).

Nearly half (48%,  $n=46$ ) of the officers experienced heavy involvement, 31% ( $n=29$ ) indicated moderate involvement, and 21% ( $n=20$ ) experienced light involvement during the response to Hurricane Katrina (4 were missing involvement level and dropped from further analyses). In addition, average AUDIT score for participants was 4.42 ( $SD: 4.83$ ), with scores ranging from 0 to 22. Greater AUDIT scores are indicative of greater levels of hazardous drinking.

### Model 1: Main Effects Model

The main effects model was adjusted for age and gender, but did not include interactions for involvement level with marital status or prior military service. Involvement level during Hurricane Katrina was associated with higher AUDIT scores for those with heavy involvement. Of those with heavy involvement during Hurricane Katrina, their AUDIT scores were, on average, 1.8 times greater than those with low involvement ( $\exp(\beta)[EB] = 1.81$ ; CI: 1.03, 3.17;  $p<0.05$ ; Table 2), controlling for age and gender. AUDIT scores for those with moderate involvement were not significantly different from those with low involvement ( $p>0.05$ ). For those with heavy involvement, the average AUDIT score is 6.05 ( $SE=0.96$ ). The mean AUDIT scores for those with low involvement is 3.34 ( $SE=0.84$ ) and for those with moderate involvement the mean AUDIT score is 3.47 ( $SE=0.65$ ).

Additional variables included in this model were marital status, military service history, age, and gender. AUDIT scores for those with a history of military service were not significantly associated with a history of military service ( $p>0.05$ ). Further, there were not significant differences in AUDIT score between those who were married/living as if married and those who were single, dating, divorced, or widowed ( $p>0.05$ ). Age was considered as a covariate, and older age was protective against greater AUDIT scores ( $EB=0.95$ , 95% CI: 0.92 – 0.97,  $p<0.001$ ). Gender did not have significant effects within this model ( $p>0.05$ ).

### Model 2: Moderation Models

The second set of models examined resilience factors, marital status and prior military service, as potential moderators to the association between exposure level and AUDIT score. The primary difference between model 1 and model 2 is the inclusion of exposure by resilience factor interactions. Thus, the first moderation model (2a) examines interaction of marital status and involvement level, and the second moderation model (2b) examines the interaction of military service history and involvement level. Neither moderation model



included both interactions to preserve model parsimony, but control variables (age and gender) were included.

**Model 2a: Marital Status & Involvement Level**—This first moderation model (2a) examined marital status, involvement level, AUDIT scores, and interaction of marital status and involvement level, controlling for age and gender. This model included military service but not the military service by exposure level interaction to preserve model parsimony. In this model there was not a significant association between involvement level during Hurricane Katrina and AUDIT score ( $p>0.05$ ; full results in Table 2). In addition, gender, marital status, and history of military service were not significantly associated with AUDIT score (all  $p>0.05$ ). However, older age was significantly associated with lower AUDIT score ( $EB=0.95$ , 95% CI: 0.93 – 0.98,  $p<0.001$ ).

**Model 2b: Military Service & Involvement Level**—The second moderation model (2b) examined military service history, involvement level, AUDIT scores, and interaction of military service history and involvement level, controlling for age and gender. This model included marital status but not marital status by exposure level interaction to preserve model parsimony.

AUDIT scores for those with heavy involvement were not significantly greater than those with lower involvement ( $p>0.05$ ). Older age was significantly associated with lower AUDIT score, on average ( $EB = 0.95$ , 95% CI: 0.92 – 0.97,  $p < 0.001$ ). In addition, within this model, female gender was protective against greater AUDIT scores, on average ( $EB=0.51$ , 95%CI: 0.27 – 0.97,  $p<0.05$ ). Marital status was not significantly associated with AUDIT score.

The primary purpose of this model was to explore interaction effects for military service history (history or no history of prior military service) and involvement level in Hurricane Katrina. Table 2 outlines the results for the interaction effects of prior military service and exposure level. Those who had a history of military service and had low involvement during Hurricane Katrina served as the referent group. Those with military service did not have significantly lower AUDIT scores than those without military service ( $p>0.05$ ).

## Discussion

It is well established that disaster exposure is associated with a wide range of negative sequelae, including mental illness, substance use, and poor physical health outcomes. Police officers are especially vulnerable to such negative outcomes because of the dangerous nature of their work, as well as the greater likelihood that they experience critical incidents, environmental hazards, and personal stressors of traumatic events. In addition, police officers exhibit a noted threshold effect with disaster exposure and poor health outcomes, with those experiencing heavier disaster exposure also experiencing greater rates of mental illness and substance use. Alcohol use in particular is an important substance of concern for police officers because they are considered members of a “hard drinking” occupation, with high rates of alcohol use and abuse.



The present work examined alcohol use for police officers who served as first responders during Hurricane Katrina and whether marital status or military service history acted as a buffer against hazardous alcohol use. In the current report, there was evidence that heavy disaster exposure was associated with hazardous alcohol consumption for police officers. The police officers with heavy disaster exposure had increased likelihood of greater AUDIT score, indicative of hazardous alcohol use. These results are consistent with previous work (e.g., Boscarino et al., 2006) that illustrate greater alcohol use among those with heavier disaster exposure. This also can be understood in the context of the broader literature that illustrates individuals drink alcohol as a way to cope with a traumatic event (Keyes, Hatzenbuehler, & Hasin, 2011).

These findings are particularly understandable in the context of the Hurricane Katrina disaster. First responders, including police officers, experienced high levels of disaster exposure as well as significant personal stressors, since more than half had extreme damage to their homes (Osofsky et al., 2011). Given our previous work on the impact of personal stressors on police officers (e.g., Violanti et al., 2011), it is understandable that such additional stressors would influence the nature of the traumatic event and the negative health outcomes that result.

Those officers with low or moderate exposure to Hurricane Katrina did not have increased likelihood of greater AUDIT score. These results suggest that low level disaster exposure does not imply increased risk of hazardous alcohol use. Rather, those with low or moderate levels of disaster exposure may be able to recover from Hurricane Katrina without hazardous alcohol use. Thus, it seems possible that these findings indicate a threshold effect, wherein disaster exposure must exceed a specific level before the individual is at risk for hazardous alcohol use. These findings are consistent with other work, such as Cerda et al. (2011) who found that high levels of lifetime trauma had greater alcohol use after disaster exposure, but this relationship did not hold for those with low levels of lifetime trauma.

Taken together, these findings suggest that those with greatest exposure to disasters are most at-risk for hazardous drinking, compared to those with low or moderate levels of exposure. Thus, when considering prevention, intervention, and treatment programs, targeting those most involved in disasters may provide the best use of scarce resources. Such a targeted approach could include screening for those police officers with greatest involvement level and then providing specific, focused interventions on those high-risk individuals. General training programs could target all police force members prior to disaster exposure and present coping techniques to support adaptive rather than maladaptive behaviors, prevention education sessions, and resources for all individuals. A more focused, tailored approach like this one would result in the most cost-effective interventions.

The second aim of the present work was to examine whether marital status and military history might act as buffers against hazardous alcohol use for police officers with heavy exposure to Hurricane Katrina. These results indicate that marital status did not provide a protective effect for the police officers under study. For the present study, marital status was assessed by asking officers to indicate their current relationship status, and the results did not indicate a significant protective effect between exposure level and alcohol use. It may be

that marital status did not serve as a protective factor because in other work, we have found that marital satisfaction, rather than simply whether the individual is or is not married, was the influential factor in buffering hazardous alcohol use. For example, Homish and Leonard (2008) found that greater marital satisfaction was associated with reduced risk of alcohol problems over time for both men and women. Additionally, marital dissatisfaction is associated with subsequent alcohol use disorder diagnosis (Whisman, Uebelacker, & Bruce, 2006) as well as findings that greater marital satisfaction was associated with better treatment outcomes in a clinical sample (Maisto, McKay, & O'Farrell, 1998). Thus, it seems plausible that marital status did not capture the complex influences marriage exerts and as such, a more comprehensive measure, such as satisfaction, may better account for the important effects marriage plays in reducing hazardous alcohol use. As such, future studies would benefit from including marital satisfaction, rather than simply marital status, as a way to examine what protective effects may be afforded.

Military status also did not provide a protective effect against hazardous alcohol use. These findings are contrary to our previous work, which found that police officers without previous military experience had greater stress levels after critical incidents than those with previous military service (Hartley et al., 2013). Given that military training affords additional proficiencies, including leadership skills, unit cohesion, and even self-confidence (Andrisani & Daymont, 1991), it is understandable that those with previous military service would have more personal resources with which to cope with traumatic events.

In contrast, other scholars have found that military service history did not significantly predict reduced occupational stress responses or success while at the police academy (Patterson, 2002; Wright, Dai, & Greenbeck, 2011). Patterson (2002) found that more years of police experience did act as a buffer for stressful occupational events. This is a salient finding as it is consistent with our results, which indicate that older age was protective against hazardous alcohol use.

This work should be considered in the context of its limitations. First, the sample population included police officers from a Police Department in the New Orleans area. Thus, these findings may not be generalizable to police officers in other departments, other first responder groups, or those who do not work in emergency management fields. However, there is a large body of work that examines first responders and the negative health consequences of disasters, and there is consistent, valid conclusions from that work. In addition, the traumatic incident under study was Hurricane Katrina, one of the strongest storms to impact the United States in the past 100 years (Waple, 2005) and as such, other traumatic events may not be comparable and may impact these results' generalizability. This too, is diminished in light of previous work that has found consistency in first responders' health effects among disparate traumatic incidents. Additionally, the cross-sectional nature of the study design prohibits causal pathways, and conclusions may not be made regarding whether trauma exposure was predictive of hazardous alcohol use. Further, this study is limited by its small sample size, and all measures were self-reported. As such, officers may have altered their responses because of social desirability bias, and true alcohol use may be greater than initially reported. However, other researchers have successfully examined alcohol use using self-report methods and have established valid and reliable results.

However, these limitations do not diminish the strengths of this study, particularly the police officer sample, an important population who experience traumatic incidents at much greater rates than the general population. Further, this work builds on current knowledge of hazardous alcohol use by police officers and indicates that there may be a threshold effect with traumatic exposure and hazardous alcohol use.

In conclusion, the current report examines whether heavy exposure to Hurricane Katrina is associated with hazardous alcohol use, and whether marital status or military service history has a protective effect. The results do illustrate that heavy disaster exposure was associated with hazardous alcohol use among police officers, although neither marital status nor military service history buffered this relationship. Further work is needed to clarify these associations and determine whether there is a temporal order to traumatic stressors and hazardous alcohol use among police officers. In addition, the noted threshold effect needs further consideration. Our results suggest that those with low or moderate disaster exposure do not have an association with hazardous alcohol use, while those with heavy exposure do. This is critically important for prevention, intervention, and treatment efforts, as targeting those with greatest exposure may provide the most efficient and cost-effective means for reducing the poor health outcomes associated with disaster response.

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**Table 1**  
**Characteristics of Officers During Hurricane Katrina**

Gender	Percent	Number
Male	78.4%	76
Female	21.6%	21
<b>Race</b>		
European American	53.5%	53
African American	41.4%	41
American Indian, Alaskan Native	1.0%	1
Other	4.1%	4
<b>Relationship Status</b>		
Married or Living as if Married	62.2%	61
Not Married	37.8%	37
<b>Military Service</b>		
Military Service History	22.5%	22
No Military Service History	77.5%	75
<b>Level of Involvement</b>		
Light Involvement	21%	20
Moderate Involvement	31%	29
Heavy Involvement	48%	46
<b>Mean Age</b>	45.1 (SD: 7.8)	
<b>Mean AUDIT Score</b>	4.4 (SD: 4.8)	

**Table 2**  
**Models Examining Factors Related to Current Alcohol Use for Officers with Involvement during Hurricane Katrina**

Variables	Model 1 Main Effects Model		Model 2: Moderation		
	EB	95% CI	2a: Marital Status	2b: Military Service	95% CI
<b>Involvement Level</b>					
Low	[Ref]		[Ref]	[Ref]	
Medium	1.0	0.6–1.9	0.84	0.88	0.44–1.75
High	1.8*	1.0–3.2	2.0	1.6	0.85–2.9
<b>Age</b>	0.95***	0.92–0.97	0.95***	0.95***	0.92–0.97
<b>Gender</b>					
Male	[Ref]		[Ref]	[Ref]	
Female	0.54	0.3–1.0	0.54	0.51*	0.27–0.97
<b>Marital Status</b>					
Not Married or Living as if Married	[Ref]		[Ref]	[Ref]	
Married / Living as if Married	1.1	0.7–1.7	1.1	1.1	0.72–1.7
<b>Military Service</b>					
No Military Service	[Ref]		[Ref]	[Ref]	
History of Military Service	1.3	0.8–2.2	1.3	0.51	0.13–2.0
<b>Interaction Effects</b>					
Marital Status × Low Involvement Level			[Ref]		
Marital Status × Moderate Involvement Level			1.4		
Marital Status × High Involvement Level			0.84		
Military Service × Low Involvement Level				[Ref]	
Military Service × Moderate Involvement Level				2.9	0.57–14.8
Military Service × High Involvement Level				2.8	0.61–12.7

Note: EB=exp(β); 95% CI=95% Confidence Interval;

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p<0.001;

\*\*

p<0.01;



50.0>d  
\*

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